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Attendance Monitoring System

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Abstract:
Abstract— The "Attendance Monitoring System" is designed to develop a student attendance system that includes a convenient attendance module along with an android app that can effectively manage student attendance at different institutes. Upon identification of the participant, attendance is marked. Fingerprint recognition technology is used to recognise students. It is assumed that fingerprints are the fastest and best method of biometric identification. They are safe to use, unique to each person and in one's lifetime they don't change. This attendance management system is used for keeping the record of students in an organized organization such as school, college, universities, etc. This application maintains a database which has the details of the students such as their name, unique id, branch, semester etc. Once the attendance is calculated for a specific period of time and if the attendance is found to be less than a desired level then a corresponding email will be dropped to the parents or guardians of the student regarding the low attendance of the student. This fingerprint matching helps in avoiding proxy attendance by others. This would also improve the accuracy of attendance records as it will save both students and teachers valuable time and even remove all roll calling problems. The extra workload on teachers will be reduce using proposed system as it is also possible to make a list of students whose attendance falls below a predefined percentage using a mobile application itself.

Keywords: *Biometric, fingerprint recognition, proxy prevention, Student attendance system, application*

I. INTRODUCTION

Fingerprint authentication is one of the world's most popular systems of authentication. It is commonly used because of its accuracy and uniqueness. The magnetic card attendance system has been widely used in the past. But there are plenty of bugs in this system. The card may be damaged or lost. It is not easy to forge this fingerprint attendance system as it is highly secure.

This paper describes the monitoring system for attendance using fingerprint technology that can be used in a school or university setting. It is made up of two processes: registration and authentication. The user's fingerprint is collected at the time of registration and its special features are extracted. It is then stored together with the identification of the students as a model in a server. During authentication, the user's fingerprint is captured again, followed by feature extraction and comparison with the database template to determine a match prior to attendance.

The pre-existing attendance management system does not measure the percentage of students attending. The proposed system tests the presence time and also the lecture he / she is present for. Components include Fingerprint Sensor, ARM processor, Bluetooth unit, Keypad, LCD Display etc. Because the implementation and use of biometric software is easier, most institutions use the biometric route to verify their students and staff's time and attendance. Using Serial UART to USB Pen Drive Adapter and Bluetooth interface, the Embedded module with a small LCD user interface can be

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interfaced with the phone. For the biometric model, small storage space is required to reduce the size of the necessary server memory and standardize it. The authentication of the Fingerprint has many benefits, such as the most affordable method for biometric user authentication. It is considered one of the most commonly used and easy to use biometric authentication systems.

II. Related Work

There are many related works in schools, colleges, universities and industries concerning attendance management. In, each student's attendance is taken during both the exam times and regular hours as well. A fingerprint scanner is used and the student's presence in the database is registered. Authors built a mobile Zig-bee software college attendance program. The attendance report will be sent once in 15 days to the relevant HOD department or class-in-charge. RFID is also sometimes used to track student attendance. A tracking system was designed by the researchers in using the student metric card embedded with an RFID tag to know where they were. When the RFID reader reads the metric card, it will cause the device to read the data from the RFID tag and compare it to the server where, for monitoring purposes, the management can display the access data online.

Authors have developed a system primarily for employee attendance management. It records employee attendance once a day. Some authors also design the wireless attendance management system. wireless attendance is managed. Once a specific employee's attendance is taken via a biometric device, the presence is stored via Wi-Fi in the database. Authors used a fingerprint sensor to develop a system for student attendance management. Students will be informed of their attendance via an LCD screen that shows the relevant information whenever the finger is held by the student.

III. Proposed System

The main goal of this project work is to provide a replacement for the existing attendance system, which usually appears too late to take a suitable action as students only get to know about their attendance at the end of the semester and therefore they will not be able to perform well. This can be accomplished by designing a wireless attendance system that delivers notifications to the student if their attendance is below 75 percent or by sending an email to the student's parents regarding the student's low attendance to avoid further problems.

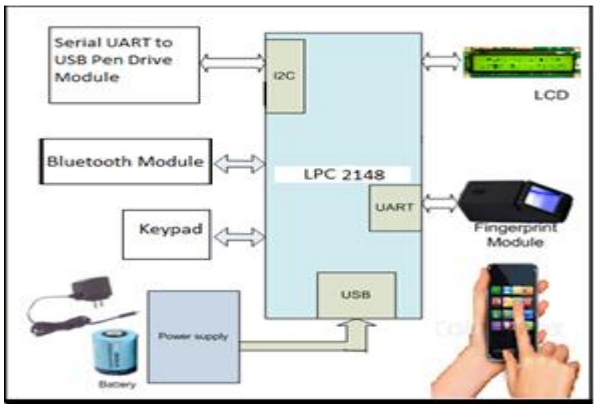

Fig. 1. Block diagram of proposed biometric attendance system

The solutions to each of the problems encountered are at the cost of some compromise or other. But these problems can be avoided by combining the fingerprint module with the Bluetooth module to obtain correct attendance data along with the mobile app installed on the user's mobile phone. Thus, once the fingerprint module with perfectly stored database is installed, the need to maintain attendance register could be reduced. Figure 1 displays the proposed biometric attendance device block diagram.

The proposed biometric wireless attendance system includes an ARM7 processor, a fingerprint module, a display module, a Bluetooth module and an interface with an SD card. The names of all students and teachers will be registered in the registry along with their Id, subject Id and unique fingerprints. When verifying the teacher's identity after authorization, students need to place

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fingerprints on a the module one by one. This module performs the analysis of previously stored fingerprints in the database and currently taken fingerprints. On the basis of this comparison, the final decision is made and displayed on the LCD. This fingerprint matching helps in proxy prevention by others.

IV. Implementation Details

The most important hardware and software requirements for prototype implementation are listed below:

A. Hardware Components

1) ARM 7 Processor: The ARM7 family is a 32-bit RISC microprocessor core enhanced for applications that are power-sensitive and low cost. IC-LPC2148 is being used in this work. The display module for Fingerprint, Bluetooth module, is connected to the ARM processor. This unit requires + 3.3VDC to operate properly.

Fig. 2. ARM Processor

2) Fingerprint Module: This is a TTL UART interface fingerprint sensor module for direct connection to the UART microcontroller. Fingerprint data can be stored in the module by the user and configured in 1:1 or 1: N mode to identify the person. Figure 3 shows the module for the fingerprint.

Fig. 3. Fingerprint Module

The fingerprint module has good image processing capabilities and is able to capture up to 500dpi resolution image successfully. The module can interface directly with the microcontroller at 3.3V or 5V.

3) Bluetooth Module: HC-05 module is a serial port protocol (Bluetooth SPP) module. It's very easy to use. The HC-05 module is designed to provide a transparent serial wireless connection.

Fig. 4. Bluetooth Module

The Bluetooth serial port module is a qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3 Mbps modulation and a complete baseband and 2.4GHz radio transceiver. Together with CMOS technology and AFH (Adaptive Frequency Hopping Feature), it uses CSR Blue core 04-External single chip Bluetooth system.

4) Serial UART to USB Pen Drive Module: This module makes it possible to read, write files and directories on USB Pen Drive from easy to use DOS as serial interface commands.

Fig. 5. Serial UART to USB Pen Drive Module

5) Display Module: A 16 * 2 LCD is used in this device. The teacher's and student's correct identification confirmation is shown along with the roll number on this LCD. For its proper operation, this system needs + 5VDC. Two integrated voltage

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regulator circuits are used in this unit. IC 7805 includes Bluetooth module, fingerprint module and screen module with + 5V powered power supply. LM317 is a linear voltage regulator that supplies ARM processor with + 3.3V regulated power supply.

Fig. 6. Display Module

B. Software Requirements

a) Operating system: Windows XP or later

b) Keil µVision4

c) Eclipse IDE

d) Android SDK

e) Programming Language: Embedded c

f) Android Application Development

C. Working

The complete working process explaining how this attendance management system will be used by students and teachers is explained in the form of the flow chart below. The attendance is correctly labeled, using this method without any question. The report can be generated in the excel sheet. Once the report is generated, it can be checked which student attendance is less than the attendance limit set by the Institute. The contact email id of the parent or guardian of all the student will be saved in the database. If the attendance is found to be less than a desired level then a corresponding email will be dropped to the parents or guardians of the student regarding the low attendance of the student. This will be done at specific interval within the semester instead of at the end of the semester. This system will help the parents or guardians to know the attendance of their ward and certain action may be taken in case of low attendance by them to avoid any further problems.

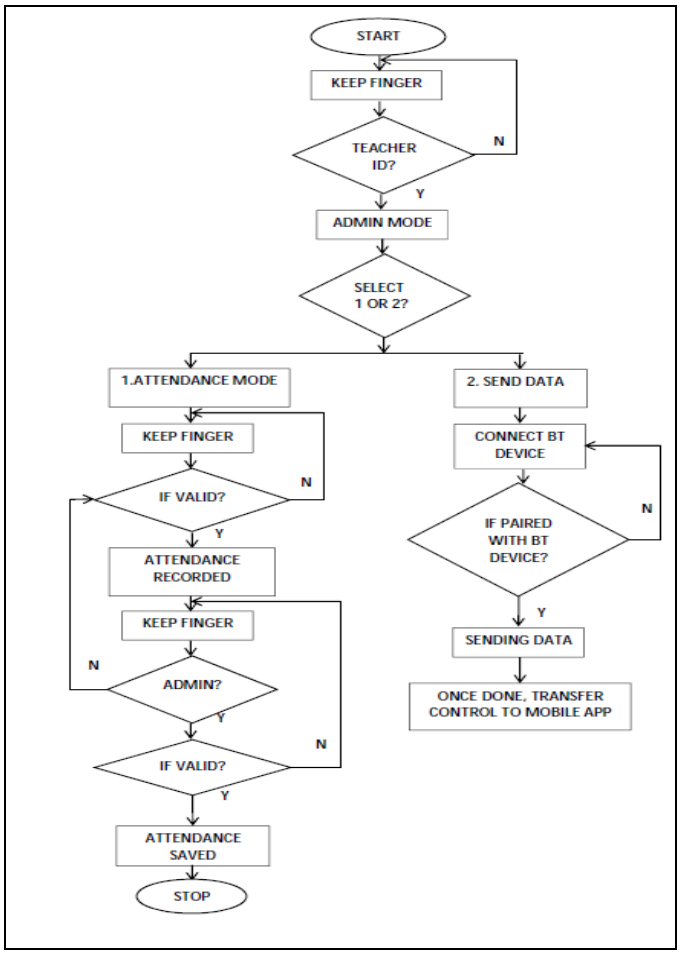

Fig. 7. Flowchart for proposed attendance system

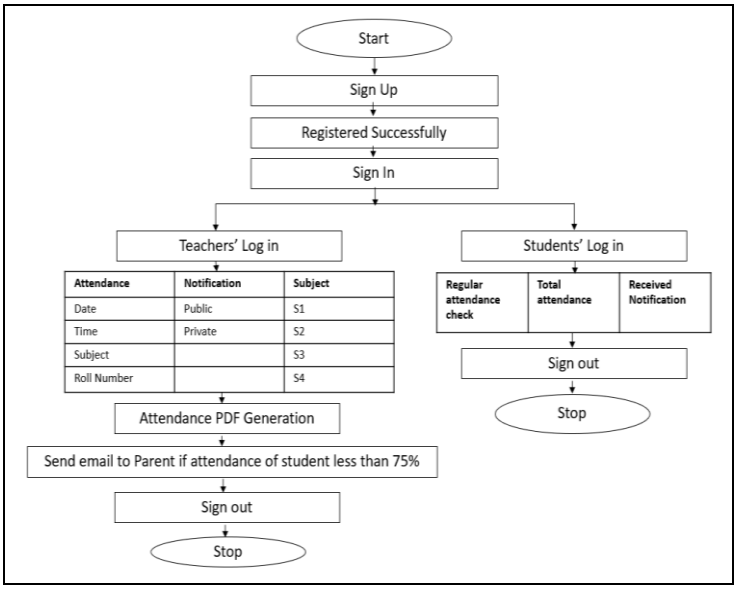

Fig. 8. Process through mobile application

V. RESULTS

Dependence on the conventional manual attendance process is drastically reduced with such "Smart Attendance Process" as all work is automated using a handy kit that is integrated with

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the smart mobile software. In the mobile application itself, students will receive notifications about the lecture schedule & attendance.

Fig. 9. Prototype of smart attendance system

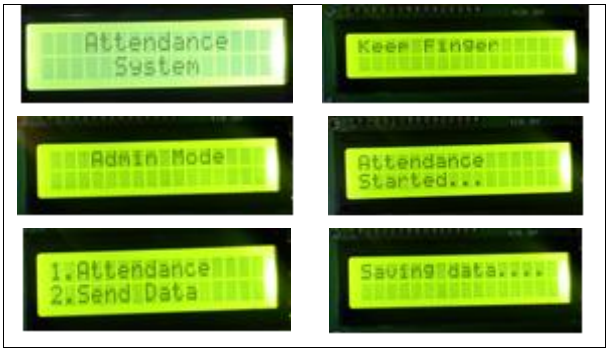

Fig. 10. LCD Notifications

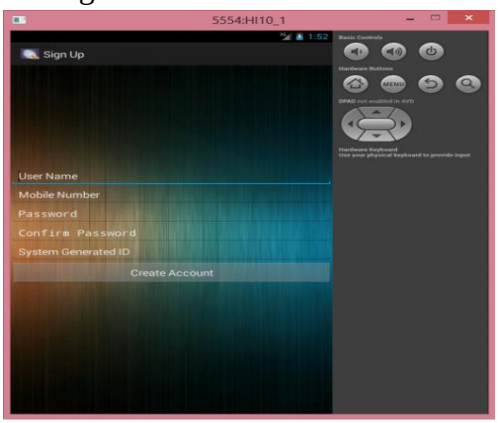

Fig. 11. Mobile application screen shot

Figure 9 illustrates the prototype of the proposed smart attendance system. Figure 10 shows the LCD notification for the corresponding step and figure 11 shows one screen shot of mobile application. At present the system is able to provide LCD notifications appropriately and mobile application is working correctly to manage the attendance and to generate the excel report of attendance. If the attendance is found to be less than a desired level then a corresponding email will be dropped to the parent or guardian of the student regarding the low attendance of the student.

VI. Conclusion

The increasing number of proxies & paperwork required for attendance is extremely critical issues in current education system. The proposed system provides personal alert to the students about the decrease in attendance below predefined threshold value and provides its details to their parent or guardian before it becomes an issue in further submission & term work. The system will help teachers become more trouble-free, and when applied in full scale, manual work will reduce by a significant factor.

VII. Acknowledgement

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